

CLAIMS

1. An apparatus for analyzing batch samples of flowable objects comprising:

an object feeder having a metered bottom opening which opens onto a metering belt, the metered bottom opening being adjustable in accordance with the object size;

the metering belt having a textured upper surface to engage frictionally the objects flowing from the feeder;

a conveyor located below and close to the metering belt, the conveyor having at least one object presentation area for containing the objects, and having a triggering device associated therewith for a radiation device and a data capturing means;

wherein when a sample of objects is placed in the object feeder for analysis, the metered bottom opening is adjustable to provide a free flow of objects onto the metering belt and hence onto the conveyor for imaging and wherein the adjustment of the metered bottom opening is coordinated with the speeds of the metering belt and the conveyor such that a monolayer of objects of the sample to be analyzed is arranged in at least one object presentation area and as the area moves towards the radiation device and the data capturing means, the associated triggering device sets off the radiation device and data capturing means to enable the gathering of data for analysis.

2. An apparatus as claimed in claim 1, wherein the object feeder is a hopper, the hopper is provided with a positionally-adjustable metering plate within the hopper, the position of the metering plate being adjusted in accordance with the object size.

3. An apparatus as claimed in claim 1, wherein the data capturing means is selected from the group comprising a digital camera, an analog camera, an infrared detector, an acoustical detector, a laser detector, and an ultraviolet radiation detector.

4. An apparatus as claimed in claim 1, wherein the apparatus includes a receptacle for receiving objects that have been subject to a data capturing event, the receptacle being selected from the group comprising a bin, a sealable container, a conveyor and a weigh scale.

5. An apparatus as claimed in claim 1, wherein the data capturing means is connected to a computer programmed for storing and analyzing the captured data.
6. An apparatus as claimed in claim 5, wherein the apparatus is constructed in a modular format, wherein at least one module is provided for containing the computer for storing and analyzing the captured data.
7. An apparatus as claimed in claim 6, wherein the apparatus is portable.
8. An apparatus as claimed in claim 1, wherein the at least one object presentation area on the conveyor is defined by a plurality of equally-spaced parallel transverse projections located on a conveyor belt; the conveyor belt having a covering on its top and sides for containing the objects, and defining the other sides of the at least one object presentation area, the covering having an opening which permits unobstructed irradiation and data capture of the objects within the at least one object presentation area.
9. An apparatus as claimed in claim 8, the apparatus comprising continuous cleaning means for removing objects and particulate material from the conveyor belt after a data capturing event.
10. An apparatus as claimed in claim 9, wherein the cleaning means is a brush.
11. An apparatus as claimed in claim 8, wherein the conveyor belt has a colour that provides a neutral background and a high contrast with the objects to be analyzed.
12. An apparatus as claimed in claim 11, wherein the circumference of the opening is coated with a material that reflects the radiation emanating from the radiation device into the object presentation area.
13. An apparatus as claimed in claim 12, wherein the radiation device comprises panels of light emitting diodes.
14. An apparatus as claimed in claim 13, wherein the light emitting diodes operate stroboscopically.
15. An apparatus as claimed in claim 14, wherein the apparatus is provided with a means to calibrate the apparatus prior to the analysis of the batch sample.

16. An apparatus as claimed in claim 15, wherein the means to calibrate the apparatus is provided by a reference slide, the reference slide being inserted into the conveyor so as to be presented to the radiation device and the data capturing means.

17. An apparatus as claimed in claim 16, wherein the reference slide consists of at least two sections, the at least two sections consisting of a colour reference chart section and a grey colour section.

18. An apparatus as claimed in claim 1, wherein the radiation device and the data capturing means are situated within a positive air pressure environment within the apparatus.

19. A method for preparing a batch sample of flowable objects for presentation to a radiation device and a data capturing means, the method comprising the steps of:

(a) obtaining a batch sample of the flowable objects to be analyzed, and

(b) depositing the flowable objects into an object analysis apparatus, the apparatus comprising:

an object feeder having a metered bottom opening which opens onto a metering belt, wherein the metered bottom opening is adjustable in accordance with the object size;

the metering belt having a textured upper surface to engage frictionally the objects flowing from the feeder;

a conveyor located below and close to the metering belt, the conveyor having at least one object presentation area for containing the objects, and having a triggering device associated therewith for a radiation device and a data capturing means;

wherein when a sample of objects is placed in the object feeder for analysis, the metered bottom opening is adjustable to provide a free flow of objects onto the metering belt and hence onto the conveyor for imaging, and wherein the metered bottom opening is coordinated with the speeds of the metering belt and the conveyor such that a monolayer of objects of the sample to be analyzed is arranged in at least one object presentation area and as the area moves towards the radiation device and the data capturing means, the

associated triggering device sets off the radiation device and data capturing means to enable the gathering of data for analysis.

20. A method as claimed in claim 19, wherein prior to the deposition of the flowable objects into the apparatus, a calibration process is performed, the calibration process comprising the steps of:

- insertion of a reference slide into an image viewing area opening located in the conveyor;

- capturing an image of a grey colour reference section of the reference slide;

- calculating a flat-field correction co-efficient to be applied to an image captured of the monolayer of objects arranged in the at least one object presentation area when the associated triggering device sets off the radiation device and data capturing means;

- capturing at least one image of an at least one colour chart section of the reference slide;

- calculating a colour correction co-efficient that is to be applied to the image captured of the monolayer of objects; and

- withdrawing the reference slide from the image viewing area opening.